ELSEVIER

International Journal of Accounting Information Systems
7 (2006) 36–49

INTERNATIONAL JOURNAL OF
ACCOUNTING
INFORMATION
SYSTEMS

Identifying the impacts of enterprise system implementation and use: Examples from Denmark

Pall Rikhardsson *, Pernille Kræmmergaard [1]

Aarhus School of Business, Department of Accounting, Finance and Logistics, Fuglesangs Allé 4, 8210 Aarhus V, Denmark

Received 1 March 2005; received in revised form 10 December 2005; accepted 28 December 2005

Abstract

This paper reports the results of an explorative study of six large Danish companies regarding the impact of enterprise system (ES) implementation and use. The study is a part of a larger ES study program at the Aarhus School of Business. The data collection approach applied is based on interviews and management case writing. The main results show that the impact of ES implementation and use are seldom fully predictable by management. The ES can be seen as an organizational actor in its own right; to a large extent, it influences values, culture, behavior, processes and procedures of other actors in the organization. Given the complexity, size and organizational embeddedness, the ES implementation never ends and the ES becomes a significant variable in the future direction of the organization.

Keywords: Enterprise systems; Enterprise resource planning; ERP; Organizational impact; Organizational effects

1. Introduction

Today virtually every major business has implemented at least one ES and Shanks et al. (2003) estimate that organizations worldwide have spent around US$18.3 billion per year on ESs in recent years. A study in Denmark has revealed that more that 75% of the 500 largest enterprises in Denmark have implemented one or more ESs (Møller et al., 2003), indicating that ESs are a persistent part of any business. Therefore the management and organization of ES technology and the innovative use of ESs should be considered in any business context.

* Corresponding author. Tel.: +45 89486688; fax: +45 89 48 66 60.
E-mail addresses: par@asb.dk (P. Rikhardsson), pkj@asb.dk (P. Kræmmergaard).
[1] Tel.: +45 89486688; fax: +45 89 48 66 60.

1467-0895/$ - see front matter © 2006 Elsevier Inc. All rights reserved.
doi:10.1016/j.accinf.2005.12.001

Few IT innovations have had as much impact on business organizations in the past years as ESs. An ES is a standardized software package designed to integrate the data used throughout an entire organization (Davenport, 1998). According to Nah (2002), the American Production and Inventory Control Society (APICS) defines ES as: "A method for the effective planning and controlling of all the resources needed to take, make, ship and account for customer orders in a manufacturing, distribution or service company". The APICS definition extends the concept of ES from an IT system towards a technology to manage and organize the processes of an enterprise. It should be noted that there is no agreement on terms and definitions regarding ES. This is a rapidly evolving concept and, similar to Davenport (1998), the term ES is used here to emphasize the generics of the concept rather than the terminology of an enterprise resource planning system, which would lead to a more limited scope and indicates a focus on planning and coordination (Klaus et al., 2000).

Many large enterprises have implemented ESs and have now taken the next step on their ES journey. This journey is often described in terms of waves (Shanks et al., 2003). The first ES wave includes the acquisition, configuration and implementation of the ES. The second wave includes making continuous improvements and maximizing the benefits from the ES. Second-wave ES projects have been spurred by the questions that managers ask after having gone through first-wave ES projects. These include questions such as how can we gain greater benefits from our ES investments, how can we manage and enhance our ES to continuously align the system with the strategy and structures of the organization, how will the ES impact the business and create new ways of working? (Kræmmergaard and Koch, 2002). This means that implementation issues are no longer of primary concern and that the focus has shifted to effect, utilization, development and business value enhancement.

Current research provides a good picture of the first wave (Esteves and Pastor, 2001; Dong et al., 2002). First-wave ES implementations have been explored through surveys and case studies regarding, e.g. strategic options, avoiding failures, identifying issues of alignment, improved implementation methodologies, as well as reengineering business processes (Al-Mashari, 2003). Research has only recently moved beyond the cost-intensive implementation phase to focusing on the second wave. This has included exploring issues such as the impact of ES implementation on financial performance (Poston and Grabski, 2001; Hunton et al., 2003), impacts on trust and control (Locke and Lowe, 2005), legitimization of certain (not always beneficial) practices in the organization (Dillard et al., 2005) and continuous changes in business processes (Davenport and Brooks, 2004).

Research into the second wave on the actual application and impact of ESs has a clear message: These systems have the ability to transform a business, but only if the organization is able to integrate the activities—not only internally, but also across the entire value chain (Markus et al., 2003; Ross et al., 2003; Davenport et al., 2004; Dillard et al., 2005). But before we can understand what this transformation is all about and how to manage the ES during the transformation, we need to understand the possible impact of the ES implementation and its effects on the organization. The main aim of this paper is to explore this impact.

The primary focus in this paper is on the second wave of ESs and the impact of ES implementation and use. The secondary focus is on the first wave in terms of exploring the experiences with ES implementation. Moreover, we provide an empirical exploration and theoretical knowledge of the impact of ES implementation and use. This paper draws on a study of the ES implementation and use in six large Danish companies during the period 2002–2003. The study was conducted as part of a broader research project at the Aarhus School of Business (see Møller et al., 2004), and was designed to shape assumptions and provide further details

about the impact of ES implementation in large organizations. An exploratory research design was adopted, primarily drawing on case study methodology (Yin, 1994) and grounded theory (Glaser and Strauss, 1999). The following section briefly overview and discuss the methodology of the study. Next the experiences with the ES implementation are presented, followed by a description of the impact of the ES implementation and use identified in the cases. In Section 4 the impact is discussed and grounded within relevant theoretical perspectives. Implications for practice and research are also suggested.

2. The methodology of the study

The purpose of this study is to create an understanding of the impact of implementing and using an ES in a large organization. Therefore the companies selected for the study had implemented their ES some time previously allowing sufficient time to reflect on any changes that had occurred. The research is based on qualitative exploratory case studies and the basic assumptions are embedded within the interpretive paradigm (Burrell and Morgan, 1979). The method draws on the principles of hermeneutics and grounded theory by Glaser and Strauss (1999), and the results are not necessarily representative of all companies that have implemented an ES.

The methodology developed for the study is based on the phases of the hermeneutical circle and utilizes an inductive approach to the research field (Strauss and Corbin, 1990; Eneroth, 1984). This includes the following general phases:

1. The researchers define the research issue.
2. The approach should illuminate as many aspects of the issue as possible.
3. The focus of the data collection is not predefined but changes as the study progresses and more interesting issues are discovered. This ensures that new issues and aspects are not ignored. Thus the researchers approach the field with a relatively open agenda, without predefined questionnaires or structured questions. The data are collected through interviews with several managers in selected companies.
4. The empirical evidence are analyzed and the researchers select various aspects and issues for further analysis. Then the researchers return to the field and ask the managers to write a case study of the company based on a "writing guide" developed by the researchers on the basis of the interviews. This guide includes a common structure for the case in the form of a "checklist" or table of contents. The main headings are:
   a. Company description
   b. Experiences regarding the ES selection process
   c. Experiences regarding system implementation
   d. The current status of the ES
   e. The ES and organizational change
   f. Financial impact of the ES
   g. Future development.
5. The interviews and cases are used to illustrate various issues inherent in the ES implementation and post-implementation process. The analysis of the empirical data is based on an integration of the interviews and the cases written by the managers. The interviews provide the structure, the main headings and the "codes" used to classify the empirical data. The cases provided the researchers with examples, manager experiences and descriptions of the organizational impact that could be related to the final analysis of the interviews. Thus the interviews and cases supplement each other in the final analysis.

Table 1
The companies in the study

Organization	Type
LEGO	Children toys
The Municipality of Copenhagen	Municipality
Martin Group	Audio and visual effects equipment
Hydro Automotive Structures	Aluminium components for the auto industry
Bang and Olufsen	High end audio and video equipment
Fritz Hansen	Furniture

The organizations were selected through personal contacts as well as by scanning the business press for stories of ES implementations. Since the research involved the managers and required a significant amount of time for interviews (see below), the research process was quite time-consuming for the managers involved. Thus several companies opted out during the course of the study. In the end six large Danish organizations participated in the study as shown in Table 1.

Fig. 1 graphically presents the approach used to collect the empirical evidence in the study.

First, interviews were conducted with representatives of the management team—usually the chief information officer, the chief financial officer and the chief production manager. In each interview, these individuals were asked questions about the implementation process, including the impact of the ES on the organization since deployment, its value, if any, and the expected future impact. Second, the respondents were asked to write a case describing the organization's experiences regarding the implementation and use of the ES. The case had to be based on a set of standard writing guidelines distributed by the researchers. Each case went through several iterations with the researchers and the managers collaborating in the writing process. At the end, the cases were included in a book on Danish companies' experiences with ES published in late 2004 (Rikhardsson et al., 2004).

Getting managers to write a case, in collaboration with the researchers, about their experiences with ESs was a rather novel research approach that had both benefits and drawbacks. The benefits include the chance that managers had to reflect on their experiences as they wrote, thus drawing out new insights and evaluations of the ES implementation and use. As writing is a relatively systematic activity, managers could structure information and dig up facts that were not immediately available during interviews or at the time of answering the written questionnaires. Furthermore, managers could draw on the experience of other employees in the organization to verify information and supplement the descriptions in the case. The drawbacks naturally include the issues of time and resources. Managers are busy people and writing a case can take a lot of time and effort. Meeting deadlines and motivating managers to finish the cases as well as to discussing them often proved difficult. A certain amount of perseverance was thus

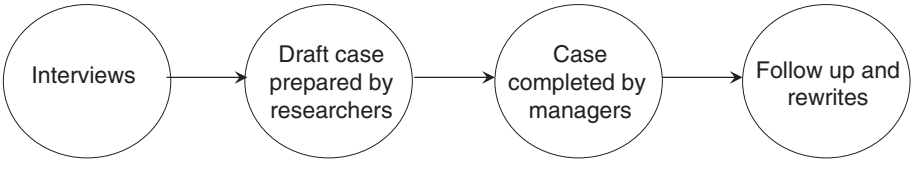

Fig. 1. The case writing process.

required by the researchers to get the cases completed. Another drawback was the different writing styles used by the managers; they did not all feel comfortable with the writing and structuring of longer texts, so some of the cases required more editing than others. Still another drawback was what could be called selective memory—i.e. only the positive aspects of the implementation process and the following post implementation phase were included in the case. While this may be a natural reaction, as managers wish to portray their performance and the organization as a whole in as positive a light as possible, the role of the researcher was to play the devil's advocate in asking critical questions and rewriting. This, however, proved difficult, and therefore this drawback may be the most significant weakness of the method. Still, as a whole, the completed cases give an impression of the impact of ES implementing in an organization. The impact is described in detail below.

3. Experiences and impact: results of the exploratory study

In the analysis of the cases and the interviews, a distinction was made between experiences and impact. Experiences were what the managers themselves had experienced during the implementation and use of the system and what they wanted to emphasize as important aspects of this process. The impact included the changes and consequences that the managers thought the system had caused on various levels of the organization. Also, it is important to note that the following observations are based on the subjective evaluations by the managers who were interviewed and who subsequently wrote the cases used in this study.

3.1. Experiences with ES implementation

3.1.1. Justification for implementation

All the companies participating had their specific reasons for implementing the ES. These can be classified into "immediate" and "strategic" reasons. The immediate reasons included the cost of maintaining a large number of old legacy systems, problems with the year 2000 conversion, and important customers requiring electronic interfaces which the current system could not handle. One of the more strategic reasons mentioned was getting a system that the organization could "grow in"—they needed a system that could easily accommodate future needs and strategic changes such as acquisitions, sell-offs and new products, without extensive reprogramming. Another strategic reason for implementing an ES was the competition factor. When competitors implemented an ES, an organization would often do the same. The managers explained this by the ever-present fear that the competitors get ahead.

3.1.2. Determination of appropriate functionality

One of the issues commonly mentioned was the difficulty in separating the "need to have" and "nice to have" functionalities during the implementation process. The ES had so many functionalities that separating the critical needs from the supplementary sometimes proved difficult. As one manager said, "It's like being a kid in a candy store—you always want more". Organizations often try to solve these problems by drawing on the experiences of consultants. However, this can be dangerous unless the consultant has an extensive knowledge of the particular industry and/or the specific business issues involved. The "nice to have" functionalities also increase the risk of "scope creep" in the implementation if the project grows without additional resources allocated to it. Some of the companies mentioned this as one of the reasons why ES projects often experience cost overruns.

3.1.3. Determining the type of ES to implement

One decision that had implications for the organization was whether to implement a "wall-to-wall" ES (one system for all processes) or whether to implement a "best-of-breed" solution (the best modules and components from different ESs). The companies in the study represented both approaches. One had implemented a global solution for the whole organization. There was only one ES server, meaning that all companies in the organization were logged on to the same server. This meant that all data definitions as well as accounting data, time data and product definitions, had to be standardized. This particular company discovered that it had 12 different definitions of operating profit in various countries that had to be merged into one. Another company implemented one type of ES in the corporate headquarters and another type in its various sales divisions around the world. This caused a number of unforeseen difficulties in data consolidation and IT support. Today the company has replaced both systems with a new "wall-to-wall" ES solution claiming that the resources needed to support such a "best-of-breed" solution do not in fact match the benefits.

3.1.4. Development of a business case

Developing a business case prior to the ES implementation was mentioned by a number of the participating companies as important. A business case should include an overview of the strategic, tactical and operational impact of the implementation project, along with the business rationale for this impact (i.e. how will the ES benefit the company through lower costs, increased sales, risk reduction, stronger competitive position, etc.). Intentions regarding project resources needed, quantified target benefits, critical success factors, etc., are often included. Interestingly, only two of the companies in the study actually followed up on their business case after the implementation was completed and the system was live. One reason mentioned was that following up on a business case that was already up to 2 years old was difficult because of changed evaluation criteria, changed business conditions as well as changes in targets and strategy.

3.1.5. Interruption of other projects

For some of the companies the implementation process was so demanding that all other development activities and projects were postponed until after the system implementation was complete. One had in fact enforced a total "new project stop" during the ES implementation period. The impact of placing an organization in a "standby mode" was difficult to identify. However, some of the respondents mentioned potential loss of business opportunities and organizational inertia.

3.1.6. Frustration among employees

All the companies mentioned that the time after going-live was characterized by user insecurity, changes, "brush fires", frustration due to errors in system set-up as well as unfamiliarity with the new system. In those companies where the implementation had been pushed through in a short span of time, this frustration was more pronounced than in the other companies where the process had taken longer. Some mentioned that the actual challenge was not always to get the software and hardware to work properly but to change employee behavior and attitudes. As one manager said, "Systems can be made to work in no time—people cannot".

3.1.7. Dissolution of project team

Dissolving the project team after the project completion was also mentioned as an important issue after the going-live date. What would happen to employees who had worked on the project

for a number of years in some cases, and now had to return to their daily tasks? Several of the companies in the study mentioned this as the problem that caused the most unrest in the organization as some employees had trouble returning to their usual areas of work. Some even chose to leave the organization and a few became ES consultants. Understandably this was an issue of concern to the organization as this situation put a drain on the company's core ES competencies. Some of the companies tried various initiatives to keep these competencies in-house by assigning super-user status to the project participants and making them part of an ES support team.

3.2. Organizational impact of ES implementation and use

An interesting question is whether top managers realized what they were committing the organization to when they gave the go ahead for an ES implementation project. Did they foresee the organizational changes that implementation of such a system would cause? Judging from the research, it is doubtful whether they did. In the companies involved, the ES became much more than just a new IT system. It initiated changes in business processes, organizational structures, communication patterns and human relations resulting in various consequences—most of which were not foreseen by the managers. Some of these consequences were immediately visible while others will take long to materialize.

3.2.1. Changes in the IT function

As a result of the ES implementation, the way the IT department worked and the competencies needed in this department changed. One organization went from 200 programmed changes in their old system to about 20 in the new system which greatly simplified the support, maintenance and upgrades processes. As a result, the IT department now supported one standard system instead of several specially designed systems; and all development and add-on activities took place in a standardized environment meaning that the competence profile of the IT department changed. Instead of being a department of programmers, "de-buggers" and "techno-nerds", the department now needed requirement analysis and system selection skills coupled with business skills and the ability to link IT and business issues. This change in skills requirements coupled with an increased organizational visibility and importance of tasks performed, enhanced the organizational power of the IT department considerably. The participating companies mentioned examples such as the IT department receiving increased funding, the function of IT manager being placed at a higher organizational level and an increase in staffing of the IT department. Some also mentioned that the IT function became more centralized as the need for independent IT departments at various locations disappeared.

3.2.2. Increased IT literacy

Another organizational change mentioned was the upgrade in IT literacy that accompanied the ES implementation effort. The ES implementation called for pre-changes in office applications, networks, and operating systems which meant that employees had to focus on various IT issues apart from the ES itself. One organization had to upgrade all office applications and operating systems on its PCs before the ES could be implemented. This meant additional courses and training for many employees which resulted in a higher IT awareness and skill level. Although this postponed the actual ES project at the outset, it had a beneficial effect later on as employees were prepared for the ES system and had a better understanding of the issues involved.

3.2.3. Coordination of accounting processes

Better coordination of accounting processes was also attributed to the ES. This also included better coordination between different departments and functions as well as better coordination between the organization and its external stakeholders such as suppliers and customers. Electronic order processes and automatic handovers from one department to another reduced the risk of errors and reduced the need for manual input. Previously, the accounting department acted as a sort of filter between decision makers and decision relevant information. Only the accounting department had access to accounting data and was responsible for the processing of this data and reporting it to decision makers. After the implementation of the ES, the accounting department no longer had this "monopoly on access". The ES now enabled managers to access accounting data themselves through advanced business analysis software. Consequently, the accounting department had to change and find other ways to service decision makers and the organization at large. Data analysis, scenario building, new ways of delivering valuable information to decision makers, and information assurance as well as presentation were mentioned as some of these areas.

3.2.4. Integration of business processes

An impact often mentioned by the companies in the study was "integration" of business processes. That is to say sales, purchasing, production, accounting, etc., were now integrated through common definitions and system architecture. In some companies certain processes in the value chain were integrated as well such as the sales function of the company being linked to the purchasing function of the customer through automatic order routines and integrated planning. This meant that the companies in the supply chain–from resource extraction to production, to distribution, to customers–were in some way cooperating and their processes (e.g. sales and purchasing) were integrated across time and space.

However, integration was understood differently by the managers interviewed. In some of the companies the word integration was merely another word for "plugged in". That is to say, one system transferred data to another system through a standardized interface. However, the term organizational integration would necessarily imply more than just being plugged in–i.e. that it is the integration of business processes rather than merely integration of systems–meaning that when sales end, the production process begins and when the production process ends, then delivery begins, etc. Integration in the supply chain implies that the supply chain becomes a whole–i.e. an entity in itself–where the actors are integrated through data exchange, behavior, flow of goods, and coordinating activities.

3.2.5. The integation effect

The integration effect, as it was termed by the managers, meant that employees suddenly had to "think beyond their departments": the tasks these employees performed now or the information they used now was dependent on the tasks performed by or the information generated by other employees upstream or downstream in the business process. For example sales employees could not close an order before the accounting department had performed and authorized a credit check on the customer in question and logged this in the ES. Another example: a production planner could not finish a planning schedule before maintenance personnel had cleared a certain machine in the system as being operational. This meant that employees needed a better understanding of the business processes of the company were connected and how different processes depend on each other. Consequently, they in fact needed a better understanding of the company as a whole.

One manager thought the integration effect problematic because the ES came with integrated models of business processes which quite often did not match the way the company's processes were usually conducted. During the course of the implementation project, all the companies had to change some of their business processes in order to match those of the ES. Some managers welcomed this as a chance to modernize company business processes and make them more effective and secure. Others responded with less enthusiasm and mentioned implementation resistance and employee obstruction as some of the negative effects. The main change involved was standardization—business processes had to be carried out in the same way throughout the organization. This often proved difficult as employees had already developed their own ways of doing things and now suddenly had to conform to processes that were "forced on them from above". Despite these various difficulties, all the companies chose to adapt to the processes in the system instead of changing the system to conform to company practice. The respondents described the changes in business processes in different ways but standardization seemed to be the most widely used term. This meant that employees now had to conform to the steps and procedures laid out in the ES. For example, one of the companies offered credit extension as part of their customer service. This could be done by individual sales representatives in the old system. The new system however, required certain procedures to be followed in order to extend credit including standardized extension periods, charges for credit extension, and authorization by the accounting department. The fact that the sales representatives could no longer extend credit to "their" customers caused some dissatisfaction with the new system. However, management did not budge and soon the new procedures were followed. So, in effect, the new system changed customer service, changed the behavior of the sales representatives and forced them to interact more with other functions in the company.

3.2.6. Changes in financial performance

The financial impact of ES implementation can be classified into income effects and cost effects. However, it is often difficult to isolate the financial impact of the ES from other variables that affect the financial performance of an organization. It is especially difficult to evaluate how an ES influences corporate income. One example could be that the ES leads to better customer support in the form of shorter order cycles or better customer service. Increases in income only materialize if, e.g., the customer buys again or other customers are drawn to the company because of its good customer service reputation. Consequently, the ES in itself does not increase income but income increases because of the enhanced customer service quality which is *enabled* by the ES. Needless to say, a number of other factors also play a role such as better training of sales personnel, promotional campaigns and the bankruptcy of a competitor.

Another difficulty in isolating the financial impact of the system appears when the ES increases capacity but maintains cost levels. For instance when an activity can be carried out more effectively and thereby release some of the personnel to other tasks, the total employee cost of the organization remains the same but more activities are carried out. That is to say, a saving occurs but it does not appear so in the financial accounts. Also, increases in the administrative capacity were mentioned by several of the respondents as an important impact—the organization could now handle larger volume (e.g. transactions, orders, customers) with the same number of employees.

Identifying the impact of the ES on costs is often easier than identifying the impact on revenues. The companies participating in the survey mentioned several specific cost effects. Reduced inventory costs and a related reduction in cost of capital were most often mentioned. The reasons for reduced inventory costs were attributed to better planning, better coordination

with suppliers and customers, better integration between purchasing, production and sales, and shorter order cycle times. Companies could order smaller quantities at a time and thereby reduce inventory costs by up to 25%. Some managers also reported reduced costs due to the lower error rate experienced in purchasing, production and sales.

All the companies mentioned that ES investments were high. Usually the licenses and cost of acquiring the software were only a small part of the overall investment while consultancy costs, personnel costs and internal process change costs accounted for most of the overall investment. A financial impact not frequently mentioned was the fact that the ES implementation occupied resources that could have been used on other projects. The fact that the ES implementation was the largest and most complex project undertaken by the companies postponed other development projects until the ES implementation was completed. The financial impact of postponing other projects (e.g. launching new products, changing processes, or initiating R&D efforts) were difficult to measure.

On the subject of measurement, some of the companies admitted that they did not follow up on the business case that was prepared before the implementation began. Some said this was due to the "phew" factor—i.e. after a difficult implementation the responsible managers said "phew" and moved on to other issues. Some companies tried to measure the business impact compared to the business case and discovered that in the months or years since the business case was presented, the world had "moved on" and some of the assumptions and calculations in the case were no longer relevant and therefore made comparisons difficult.

3.2.7. Maintenance of competitive position

An often cited reason for implementing an ES is the hope to gain a competitive advantage. However, the managers in this study, did not fully agree with this. While the ES might be a prerequisite for competing and an enabler of competitive strategies, virtually all other companies implement ES as well, so the advantages for the individual company were negligible. To them, the ES was a combination of software, hardware, persons, and work processes where the sum was greater than the individual parts. Having said that, the managers stressed that the ES could

Table 2
An overview of the impacts of the ES implemented in the participating companies

Organization	Baseline	Main stated impacts of ES
LEGO	Financial crisis, complicated business processes; many old legacy systems	Streamlined business processes Better integrated processes Changed business practices
The Municipality of Copenhagen	Old fragmented IT architecture; ineffective accounting processes	Increased business process efficiency Increased IT literacy Increased flexibility regarding adapting to political decisions
Martin Group	Management crisis and old legacy systems	Better integrated processes Tool for the new management
Hydro Automotive Structures	Old non-integrated legacy system, low user acceptance	Increased transparency of processes Increased data quality
Bang and Olufsen	Many old legacy systems, Y2K problems	Reduced stock Increased flexibility
Fritz Hansen	Strategic change, old non-integrated system	Better support of business process Better support of stratetgic initiatives Better supplier control

be seen as the "entrance ticket" to the market—without the ES the company could not compete. Thus the ES enabled the company to compete whereas the success of the company was still dependent on factors such as product quality, price, customer service, promotion etc. The ES might have an impact on these issues but it is still a second order impact—i.e. the system enables but is not in itself sufficient for changes to take place. The respondents in the study all agreed that the ES was an important factor which enabled them to compete on the global market. Another important issue mentioned was how the system enabled linking suppliers and customers to company operations but also at the same time decreased the dependency on suppliers and customers through web-based marketplaces.

An overview of the impact of the ES implemented in the study is shown in Table 2.

4. Discussion and conclusions

It becomes apparent from the above description that the implementation of an ES is an organizational development "journey" rather than a system implementation project. This is mainly because:

1. The ES supports processes and not functions.
2. These processes are integrated meaning that there is only one database and data structure.
3. These processes are based on standard processes set up in the system often requiring the organization to change their own existing processes.
4. Focus during the implementation of the system is not as much on technical aspects, but is instead related to organizational and business process issues.

The ES is not just a "system" but becomes more of an "actor" in the organization defining possibilities, costs, benefits, behavior, integration, and the relation between other organizational actors. That is to say the ES participates in the daily interaction within the organization (Hanseth and Braa, 1998; Krømmergaard, 2000). To understand this, we need to expand a bit on how an organization is created and how it changes and develops.

It could be said that an organization is always in a stage of becoming—i.e. it never ceases to change and never reaches a stage where all organizational dynamics are at a stand still (Astley and Van de Ven, 1983; Hatch, 1997). An organization is basically created through the interaction between actors (i.e. managers, employees and external stakeholders such as suppliers and customers). Through the history of the organization and in the ongoing interactions in every day life, the organization develops assumptions on what is the predominant language, value and culture, and more specifically what are the processes, plans, procedures, rules, instructions and programs in the organization (Weick, 1979)—or what also has been called the action space in the organization (Fast, 1992). The existence thereof creates order in an otherwise chaotic pattern of interactions within the organization. The action space tells employees how to do their job, which expectations others have of them, which business partners the organization has, what relations one department has to another, which processes exist, etc. The action space can become "taken for granted" and is rarely brought to the surface and reflected on. Nevertheless it remains significant in influencing how actors within an organization think and act (Orlikowski and Gash, 1994).

Organizational actors do not have the same perception of reality. There will always be contradictions between actors' perception of reality which they will use in their interactions within the organization. The existence of contradictions in an organizational context is just as

important as consensus and order. Contradictions can be seen as sources of energy or a catalyst for organizational change (Boudreau and Robey, 1996). Since contradictions are important, new organizational actors are important for the further development of the organization. An ES can be seen as such a new actor. When the system set-up gives another version of reality than the one existing within the organization, there will be contradictions, which can lead to changes.

This is apparent in all of the organizations participating in the study and in this sense the ES is facilitating change. The implementation of an ES can thus change both the basic assumptions about what is the predominant language, value and culture, and also the specific procedures, rules, and processes within the organization (Dillard et al., 2005). Although ES have greater influence on creating the action space than most other information technologies, organizational outcome is not necessarily determined by the ES implementation itself but by the subsequent utilization of the system. An example is when sales staff can no longer extend credit to certain customers thus impacting on processes and procedures but also on values such as customer service and power relations between sales staff and the accounting department. Thus the implemented system structure needs to be enacted by organizational actors to have an impact (Dechow and Mouritsen, 2005). When an ES interacts with the actors of the organization, the outcome of the interaction is only partially predictable and the ES as a deterministic technology is not valid (Boudreau and Robey, 1999). One has to keep in mind that the organization already has an action space and a history before implementation. The changes are the results of the interaction between the system and the organization. This is also apparent in the companies studied as the changes resulting from the ES implementation were seldom fully predicted neither in the short nor in the long run.

The ES will thus influence the organizations' stage of becoming. Thus, instead of understanding the implementation and use of an ES as an activity taking place within a given time frame (e.g. as a project), one should understand the implementation of an ES as an ongoing process, a journey (Markus and Tanis, 2000) that basically never ends. New problems which require changes or expansion within the system are recognized. New functionalities within the system are discovered and considered to be interesting. Previous procedures and processes are suddenly regarded as being inappropriate. New releases of the system containing updated best-practice procedures and processes can create a demand for change. New modules are bought and added to the system. Thus, letting an ES into the organization is a commitment to change, a process without end.

The implications for companies are first of all that an organization should be aware that implementing an ES is not only a project activity, but an ongoing process. The going-live date should be understood as being the first step of many—whether the company wants this or not. For academia the challenge for further research would be to find out how dominating the ES is for the creation of the action space in the organization and the future development of the organization. Another challenge would be to find out to which changes the system might constrain or facilitate in the long run. A more fundamental question in this context could perhaps be whether the ES supports business processes or whether it in itself is a fundamental new way of doing business?

References

Al-Mashari M. Enterprise resource planning (ERP) systems: a research agenda. Ind Manage Data Syst 2003;103(1):22–7.
Astley WG, Van de Ven AH. Central perspectives and debates in organization theory. Adm Sci Q 1983;28:245–73.

Boudreau M-C, Robey D. Coping with contradictions in business process re-engineering. Inf Technol People 1996;9(4):40–57.

Boudreau M-C, Robey D. Organizational transition to enterprise resource planning systems: theoretical choices for process research. Proceedings of the 20th International Conference on Information Systems, ICIS '99; 1999.

Burrell G, Morgan G. Sociological paradigms in organizational analysis. Heinemann Books: London; 1979.

Davenport TH. Putting the enterprise into the enterprise system. Harvard Bus Rev:121–31 [July/August].

Davenport TH, Brooks JD. Enterprise systems and the supply chain. J Enterp Manag 2004;17(1):8–19.

Davenport TH, Harris JG, Cantrell S. Enterprise systems and ongoing process change. Bus Process Manag J 2004;10(1):16–26.

Dechow N, Mouritsen J. Enterprise resource planning systems, management control and the quest for integration. Account Organ Soc 2005;30(7/8):691–733.

Dillard J, Ruchala L, Yuthas K. Enterprise resource planning systems: a physical manifestation of administrative evil. Int J Account Inf Syst 2005;6:107–27.

Dong L, Neufeld D, Higgins C. The Iceberg on the Sea: What Do You See? Proceedings of the Eighth Americas Conference on Information Systems; 2002. p. 857–64.

Eneroth B. Hur mäter man "vackert" (How do you measure "beautiful"). Sweden: Akademilitteratur; 1984.

Esteves J, Pastor J. Enterprise resource planning systems research: an annotated bibliography. Commun AIS 2001;7(8):1–52.

Fast M. Virksomhedens internationalisering som en social konstruktion (Corporate internationalization as a social construction). Denmark: Aalborg University; 1992.

Glaser BG, Strauss AL. Discovery of grounded theory: strategies for qualitative research. New Brunswick, NJ: Aldine Transaction; 1999.

Hanseth O, Braa K. Technology as a traitor. Proceedings of the nineteenth international conference on information systems, ICIS'98; 1998. p. 188–97.

Hatch MJ. Organizational theory. New York: Oxford University Press Inc.; 1997.

Hunton J, Lippincott B, Reck J. Enterprise resource planning systems: comparing firm performance of adopters and nonadopters. Int J Account Inf Syst (4):165–84.

Klaus H, Rosemann M, Gable GG. What is ERP? Inf Syst Frontiers 2000;2(2):141–62.

Kræmmergaard P. ERP implementation—ERP as an actor. Proceedings of the 16th world computer congress 2000, Beijing; 2000. p. 345–8.

Kræmmergaard P, Koch C. Managing ERP after going-live. Proceedings of the 9th International Conference European Operations Management Association, Copenhagen; 2002.

Locke J, Lowe A. Standardisation and trust relations in ERP implementation: reflections from a case investigation. Presented at the 28th Annual Congress of the European Accounting Association, Göteborg, Sweden 18–20; 2005. May 2005.

Markus ML, Tanis C. The enterprise systems experience—from adoption to success. In: Zmud RW, editor. Framing the domains of it research: glimpsing the future through the past (173–207). Cincinnati, OH: Pinnaflex Educational Resources, Inc.; 2000.

Markus ML, Petrie D, Axline S. Continuity versus discontinuity: weighing the future for ERP packages. In: Shanks G, Seddon P, Willcocks L, editors. Second-wave enterprise resource planning systems—implementing for effectiveness. Cambridge: Cambridge University Press; 2003.

Møller C, Kræmmergaard P, Rotbøl M, 2003. Virksomhedssystemer i Danmark 2003-en analyse af de 500 største danske virksomheders ERP systemer (Enterprise systems in denmark: an analysis of the 500 largest Danish companies) (IFI working paper series no 126 ISSN no 1398-067X). Aarhus School of Business: Department of Information Science; 2003.

Møller C, Kræmmergaard P, Rikhardsson P, 2004. A comprehensive ERP bibliography 2000–2004 (IFI working paper series no 12 ISSN no 1398-067X). Informatics and Statistics, Aarhus School of Business: Department of Marketing; 2004.

Nah FF-H, editor. Enterprise resource planning solutions and management. Cambridge: IRM Press; 2002.

Orlikowski WJ, Gash DC. Technological frames: making sense of information technology in organization. ACM Trans Inf Sys 1994;12/2:174–207.

Poston R, Grabski S. Financial impacts of enterprise resource planning implementations. Int J Account Inf Syst 2001;2:271–94.

Rikhardsson P, Kræmmergaard P, Møller C, editors. ERP-Enterprise Resource Planning—danske erfaringer med implementering og anvendelse (ERP Systems—Danish experiences with implementation and use). Copenhagen: Børsen Bøger; 2004.

Ross J, Vitale MR, Willcocks LP. The continuing ERP revolution: sustainable lessons, new modes of delivery. In: Shanks P, Seddon P, Willcocks L, editors. Second-wave enterprise resource planning systems—implementing for effectiveness. Cambridge: Cambridge University Press; 2003.

Shanks G, Seddon PB, Willcocks LP, editors. Second-wave enterprise resource planning systems: implementing for effectiveness. Cambridge: Cambridge University Press; 2003.

Strauss A, Corbin J. Basics of qualitative research—grounded theory procedures and techniques. SAGE Publications; 1990.

Weick K. The social psychology of organizing. McGraw-Hill, Inc; 1979.

Yin R. Case study research. London: Sage; 1994.